to separate them from the hardened mucilage. The spider seemed to be looking at the ants, but probably did not comprehend what was going on; for it soon went to work and made a cocoon, which it carried in its mandibles. Several times I tried to take it away, but could not get it without injuring the spider. At last, after it had carried it over three weeks, I saw the cocoon lying on the ground, and supposed it had been abandoned. On pulling it to pieces, I found it composed of a cocoon and chrysalis shell of some moth, together with bits of stick, and parts of the dried flowers of the common everlasting (Gnaphalium polycephalum). While I was examining the cocoon, the spider came back to where it had left the cocoon, and appeared to be looking for it. I now put the fragments (which were partly held together by the web wound around them) near the spider, which immediately seized them with a quick, almost frantic eagerness.

The next morning it had again made quite a respectable-looking cocoon, — an irregular sort of ball, which it persevered in carrying some two months, and I do not know how much longer; as toward the latter part of October it succeeded in making its escape, and carried its precious charge away.

During all this time it took no food. I captured a number of different insects, and put them in the cage, to all of which it paid no attention. Grasshoppers recognized the spider as a foe, and at first seemed paralyzed with fear, but gradually overcame their fright, and became lively in its company.

Mary Treat.

ARNOLD GUYOT.

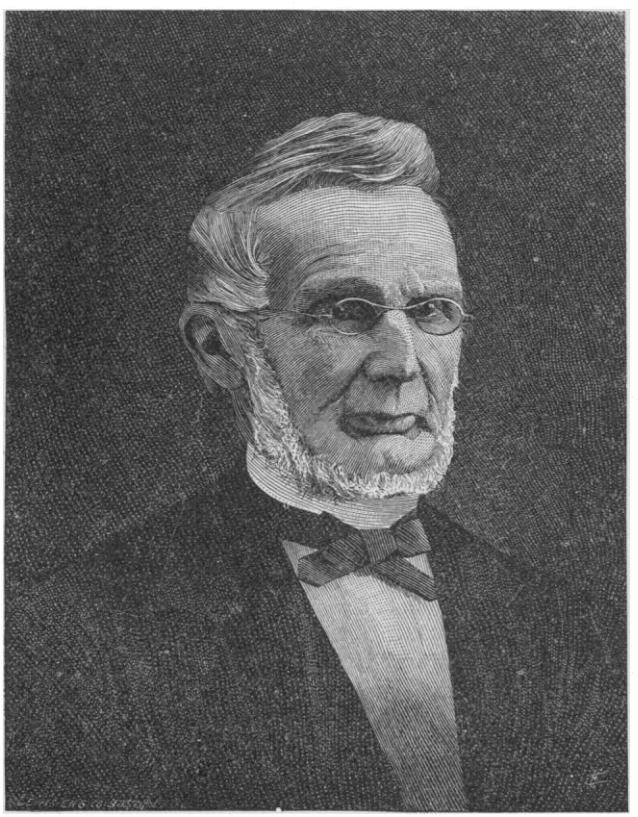
Professor Guyot, whose death occurred at Princeton on the 8th of February, at the age of seventy-seven, is everywhere honored for what he was, as well as for what he did. There is hardly an epithet appropriate to a good scholar, which may not be applied to him, — true, wise, helpful, considerate, devout; accurate, learned, skilful in research, apt to teach, inspiring. His life was devoted to the principle laid down by Smithson for the great institution in Washington, — "the advancement and diffusion of knowledge among men." He was equally ready to engage in a long and tedious investigation, — such as the measurement of a group of mountain peaks, the tracing of lines of bowlders to their sources, the preparation of elaborate tables for the use of meteorologists, and the like, — or to make known in a popular lecture, or before a teachers' institute, or in the conversation of a parlor, or in a series of school-books, the results of his study. He never seemed to be thinking of himself, but always of his subject and his hearers. He cared very little for fame, very much for the study of nature and the education of man.

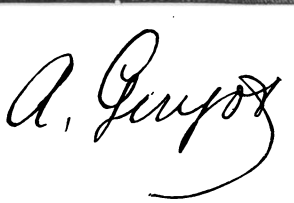
Like Beck, Follen, Lieber, Agassiz, and several who are still alive, he came to America after his academic training had been completed in foreign schools, and devoted himself to the service of his adopted land with an enthusiasm rarely equalled and never surpassed by the native citizen. He avoided the snare of routine which entraps so many of the college professors of this country; but, by always proposing to himself new lines of inquiry and new subjects of investigation, he kept his mind perpetually fresh, so that, until the infirmities of old age attacked him, he was younger than many of his juniors. He required no 'endowment' in order to lead him to investigation, no instructions, no commission, no salary: all he wanted was freedom. So, when vacation released him from his professor's chair, he took to the field, and, with such comrades as were ready to join him, pursued his geographical researches.

His most original out-of-door work was performed in his own land before he came to this country, where, by a study which lasted for several summers, he succeeded in tracing to their primeval origin some thousands of erratic rocks strewn through the valleys of Switzerland. He thus rendered essential help in elucidating the problem of glacial action which his colleagues, Agassiz and Desor, were engaged in solving. Almost as remarkable was the study which he began, soon after coming to this country, of the great range of Appalachian mountains which borders the Atlantic seaboard, from Maine to Georgia. He determined barometrically the height of the principal summits in the White Mountains, then made a prolonged series of similar measurements in the Black Mountains of the south, then produced a memoir (accompanied by a map) of the entire chain, — a memoir which remains to this day the best existing description. More recently he turned his attention to the Catskills, and revealed the fact, that in this group of mountains, so near to the summer-resorts of wealth and intelligence, the highest peaks were not recorded upon the maps, and inferior peaks were regarded by the scientific visitor and the resident forester alike, as the actual summits. He knew that the problems of nature were always at hand; that careful observation and reflection would reveal some truths of interest and importance, whether the observer were placed in a new country or an old. He was one of those rare men who can ask a hard question, and proceed to answer it.

When he came to this country, in 1849, meteorology was hardly worthy to be called a science. He foresaw what light could be thrown on the law of storms and on the variations of climate by accurate observations extended over vast areas. But he saw, also, the need of good barometrical and thermometrical

instruments, and of accurate tables for the reduction of observations. Under the Smithsonian auspices, he superintended the production of both, applying himself with assiduous labor, for several years, to the preparation and publication of the volume which bears his name, and of which a new edition was in preparation before his final illness. It is easy to see that this work of a pioneer, in a department comparatively new, was of fundamental importance. It helped on the meteorological work which was long superintended by Professor Henry and the Smithsonian observers, and was subsequently developed on a grand scale by the government signal-service.





As we are not endeavoring to review in detail the scientific work of Mr. Guyot, but simply to point out some of the elements of his character, we pass on to his influence as a teacher. For a long while after he came to this country he was a professor without a desk, — a peripatetic teacher, engaged by the Massachusetts board of education to unfold the right principles of geographical instruction. His remarkable insight into the relations of the 'Earth and man' had been developed in the atmosphere of Berlin, when Humboldt, Ritter, and Steffens were in their prime. He learned their methods of thought: he worked out his own. His earliest utterances upon this subject were given at the Lowell institute in 1849, when, with the eloquence of an original thinker, he showed how the earth was fitted to be the dwelling-place of the human race. His task was performed with such profound perception of the truth, and with such suggestive and stimulating reflections, that the unpretentious volume of lectures (notwithstanding the fact that science has revealed so much which was then unknown) remains to this day one of the best introductions to physical geography which the general reader can find in any language. The acquaintance which he formed with American schools and teachers showed him how poor and dry and immethodical were the geographies then in use, how flat and unsuggestive the maps. He endeavored to remedy the evil, and for years was occupied, with skilled co-operators, in the production of a series of wall-maps and text-books, which have since been used in every part of the land. It is not too much to say that they revolutionized the methods of teaching geography. Every series of geographies which has since appeared shows the influence of Guyot.

During a period of nearly thirty years he has been a professor in Princeton college, and his name is cherished by hundreds of loving pupils, who have found in him a friend as well as a teacher; but until a recent period he was easily induced to lecture in other places, and his voice has often been heard in distant cities, expounding his favorite ideas.

The intimacy of Agassiz and Guyot, and the parallel courses of their lives, may be beautifully traced in the memoir of Agassiz which Guyot wrote for the National academy in 1877–78, but did not print until April of last year. It is a biographical gem. The two friends were born in Switzerland, were companions in study, were colleague professors in a post-graduate academy at Neufchâtel, were coworkers in glacial researches, were disturbed by political changes in their native canton, were emigrants to America, were neighbors in Cambridge, were comrades in sensible efforts to make science intelligible to the people, were investigators of American problems. In this memoir of his friend, Guyot has revealed himself by many a characteristic touch. After a fresh perusal of its pages, we are led to wonder how much scientific progress would have been delayed in this country, if it had not been for the inspiring and co-operating influence of these noble immigrants.

Like Faraday, Clerk Maxwell, Agassiz, Joseph Henry, and Benjamin Peirce, Guyot was a man who was devoted to research, who believed in carrying it to the utmost, and yet who was never troubled by the idea of a possible 'conflict' between science and religion. To him nature was a manifestation of God. Natural laws were divine laws. There could be no antagonism between them. On the contrary, he believed that the more we learn of the human soul, of the course of history, and of the structure of the world, the more harmonious will they appear as parts of one great plan. His faith, both in science and in religion, was so strong that his influence kept many clergymen from bigotry, many students from atheism. In him they saw a man to whom the study of science and the worship of God were alike obligatory.

THE ALASKA MILITARY RECONNOISSANCE OF 1883.[1]

This expedition arose from a desire of the department commander in the military department in which Alaska territory is situated[2] to gain some military knowledge of the Indian tribes in that district, and especially in those parts recently opened by mining discoveries, fishing industries, and other causes. Besides gaining this information, it has also done something in the interest of science, especially for geography. The part of the route here treated was almost unexplored, excepting the Chilcoot and Dayay inlets, and the portion from the Kotusk Mountains to Lake Lindeman, which had been traversed by the Krause brothers, sent out by the Bremen geographical society. If such an expression may be considered correct, it was really worse than wholly unexplored, in that the maps and books purporting to be authority over this section of the country were erroneous beyond the limits of sensible guessing. The party consisted of seven white persons, — two officers and five others, — and a number of Indians that varied from two to sixty or more.

There are said to be three or four passes through the glacier-clad mountains that separate the salt-water estuaries of the Pacific from the head waters of the Yukon, two of which are known as the Chilcat and Chilcoot trails; and over these two it has been known for about a century that Alaskan Indians of certain tribes had passed, in order to trade with the Indians on the sources of this great stream. The last (the Chilcoot) is the best of all the trails, and was the one undertaken by the party. Why this or the Chilcat route had not been picked out long ago by some explorer, especially those of comparatively recent dates, who could thereby have traversed the entire river in a single summer, instead of combating its swift current from its mouth, seems singular in the light of the above facts, and can only be explained by supposing that those who would place sufficient reliance in Indian reports to put in their maps the gross inaccuracies cited would also be likely to place reliance in the other reports of the same Indians; and these from time immemorial have pronounced this part of the river as unnavigable even for canoes, being filled with rapids, cañons, whirlpools, and cascades.

Formerly this Chilcoot pass had been monopolized by the Chilcoot Indians, who did not even allow the Chilcats — almost of the same blood — to use it: these were thus forced over the Chilcat route, which has an irksome portage of twelve or thirteen days to the head of the Tahk River (*Tahk-heen-a* of the Chilcats), a branch of the Yukon about half the size of the parent stream where it empties into the latter. Both of the bands on the upper Lynn Channel have united in keeping back the migration of the interior Indians to their waters in order to monopolize this trans-montane commerce. However, of late years, not only have the Chilcats used the mountain-pass of the Chilcoots, but both have allowed the *Tahk-heesh* or 'Stick' Indians of the interior to visit their own domain. I employed some of

[1] Explorations and surveys from Chilcoot mission, Alaska, to old Fort Selkirk, British America.

[2] Department of the Columbia, headquarters, Fort Vancouver, W.T.; Brevet Major-Gen. Nelson A. Miles, commanding.